REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed December 9, 2004. Reconsideration and allowance of the application and pending claims are respectfully requested.

I.   Claim Rejections - 35 U.S.C. § 101

Claims 16-17 have been rejected under 35 U.S.C. § 101 as claiming non-statutory subject matter. In response, Applicant has amended claim 16 to recite a "data-pausing system stored on a computer-readable medium used in conjunction with a computing device". Applicant respectfully submits that the claimed system qualifies as statutory subject matter, and respectfully requests that the rejection be withdrawn.

II.   Specification

The specification has been objected to for omitting serial/patent numbers. In response, Applicant has amended the specification to provide the missing information.

In addition, the Examiner has requested that Applicant correct any errors of which the Applicant may become aware. In reviewing Applicant's specification, Applicant has identified no such errors and, therefore, has made no corrections. Applicant will correct any errors that are discovered during the prosecution of the instant application.

In view of the above, Applicant respectfully submits that the specification is not objectionable, and therefore respectfully requests that the objections be withdrawn.

III.   Claim Rejections - 35 U.S.C. § 112, Second Paragraph

Claim 13 has been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. In particular, the Examiner states that the meaning of "a data path" is unclear.

Applicant believes that the meaning of the term "data path" as used in claim 13 is adequately clear to a person having ordinary skill in the art. The reference to "a data path along which the data is transferred contains no processor" in claim 13 is a reference to the processor 28 of the interrupt initiation circuit 26 (see Figs. 2 and 3) being outside of the path that data traverses. As is described in Applicant's specification:

> In order to maximize performance and to increase the speed of the operation requested by the host 10, *the present invention minimizes the involvement of the processor 28 by taking the processor 28 out of the data path*. Therefore, the role of the processor 28 is to accept commands from the host interface module 20, configure the registers 30, 32, and 34, and respond to interrupts from the logic circuitry 36 along line 49. Since the actual data transfer operation does not involve the processor 28 but is instead automated by hardware configured in the ECC encoder/decoder 22, the Read and Verify commands run more quickly. (Specification, page 14, lines 3-10, emphasis added)

This data path may be considered to comprise the path the data travels within the storage device controller 12. As is indicated in Figure 2, for example, the interrupt initiation circuit 26, which comprises the "processor," is outside of the path between line 18 and line 16.

In view of the above, it is respectfully asserted that claim 13 is clear and defines the invention in the manner required by 35 U.S.C. § 112. Accordingly, Applicant respectfully requests that the rejection be withdrawn.

IV.   Claim Rejections - 35 U.S.C. § 102(b)

Claims 1-20 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Glover (U.S. Pat. No. 5,751,733). Applicant respectfully traverses this rejection.

It is axiomatic that "[a]nticipation requires the disclosure in a single prior art reference of each element of the claim under consideration." *W. L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983). Therefore, every claimed feature of the claimed invention must be represented in the applied reference to constitute a proper rejection under 35 U.S.C. § 102(b).

In the present case, not every feature of the claimed invention is represented in the Glover reference. Applicant discusses Applicant's claims and the Glover reference in the following.

A.   Claims 1-8

Applicant's independent claim 1 provides as follows (emphasis added):

1.   A method for pausing a transfer of data, the method comprising:

establishing at least one threshold value that is below a maximum number of errors beyond which the errors are uncorrectable;

determining a number of errors detected in the data being transferred;

comparing the number of errors with the at least one threshold value; and

pausing the transfer of data when the number of errors exceeds the at least one threshold value.

Glover discloses a disc drive storage system that employs sector level and track level error corrections systems (ECSs). Glover, Abstract. As is described as Glover:

A disc storage system is disclosed which comprises a sector level ECS for correcting errors within a sector during readback, and a track level ECS for correcting a sector *that becomes unrecoverable at the sector level either because the number of hard errors exceeds the error correction capability of the sector redundancy*, or because the sector is unreadable due, for instance, to an inability to synchronize to the sector data. The sector level ECS is preferably implemented using a high order Reed-Solomon code capable of correcting multiple random burst errors, and the track level ECS is preferably implemented using a less complex error correction code such as byte XOR or a first order Reed-Solomon code. (Glover, column 3, lines 47-59, emphasis added)

As is apparent from the above excerpt, Glover's ECS corrects sectors that become unrecoverable because the number of errors exceeds the error correction capability. As is further described by Glover:

As mentioned above, *there are two situations where a data sector on the disc may become unrecoverable*. First, the sector may become entirely unreadable due to an inability to synchronize to the sector data (because, for example, the preamble 6 or sync mark 8 have

been corrupted by a defect on the medium). The other possibility is that the sector becomes uncorrectable; that is, the number of hard errors exceeds the error correction capability of the sector level ECS. *In these situations, the storage system pauses the data transfer and executes the track level error correction steps to recover the lost sector using the redundancy sector.*

From this excerpt, it is apparent that Glover system pauses data transfer *when data on the storage device is unrecoverable*, i.e., when the number of hard errors exceeds the error correction capability of the sector redundancy, or because the sector is unreadable due, for instance, to an inability to synchronize to the sector data.

Significantly, Glover does *not* disclose pausing data transfer when the number of errors exceeds an established threshold that is below the number of errors that exceeds the error correction capability of the sector redundancy. Indeed, Glover does not anticipate "establishing" a threshold at all. Instead, the natural limitations of system dictate the limitations or "threshold".

From the above, it can be appreciated that Glover clearly does not teach or suggest "establishing at least one threshold value that is below a maximum number of errors beyond which the errors are uncorrectable", or then "comparing the number of errors with the at least one threshold value". Indeed, it may be said that Glover actually *teaches away* from such a method. As is well established in the law, "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant . .

." *Tec Air, Inc. v. Denso Manufacturing Michigan Inc.*, 192 F.3d 1353, 52 USPQ2d 1294 (Fed. Cir. 1999).

In view of the foregoing, Applicant respectfully submits that claim 1, and its dependents, are allowable over the Glover reference. Applicant therefore respectfully requests that the rejection be withdrawn as to those claims.

B.   Claims 9-15

Applicant's independent claim 9 provides as follows (emphasis added):

9.   A system for pausing a transfer of data, the system comprising:

means for providing a full error threshold value that is below a maximum number of errors beyond which the errors are uncorrectable;

means for determining the number of full errors in data being transferred from a data storage means;

means for comparing said number of full errors with said full error threshold value; and

means for pausing the transfer of data when said number of full errors exceeds said full error threshold value.

Regarding claim 9, Glover does not teach or suggest "means for providing a full error threshold value that is below a maximum number of errors beyond which the errors are uncorrectable" at least for reasons described above in relation to claim 1.

Applicant respectfully submits that claim 9, and its dependents, are allowable over the Glover reference. Applicant therefore respectfully requests that the rejection be withdrawn as to those claims.

C.   Claims 16-17

Applicant's independent claim 16 provides as follows (emphasis added):

16.   A data-pausing system stored on a computer-readable medium used in conjunction with a computing device, the system comprising:

logic configured to establish a full error threshold value and an erasure threshold value;

logic configured to determine the number of full errors and the number of erasures in a codeword transferred from a data storage device to a host requesting one of a read command and a verify command;

logic configured to compare said number of full errors with said full error threshold value;

logic configured to compare said number of erasures with said erasure threshold value;

logic configured to pause the transfer of data if said number of full errors or erasures exceeds said full error threshold value or said erasure threshold value, respectively.

Regarding claim 16, Glover does not teach "establishing" threshold values, as is discussed above in relation to claim 1. Moreover, Glover clearly does not teach logic configured to establish a "full error threshold value and an erasure threshold value". Specifically, Glover is silent as to establishing any threshold relating to erasure.

In view of the foregoing, Applicant respectfully submits that claim 16, and claim 17 which depends therefrom, are allowable over the Glover reference. Applicant therefore respectfully requests that the rejection be withdrawn as to those claims.

D.   Claims 18-19

Applicant's independent claim 18 provides as follows (emphasis added):

18.   A circuit for detecting errors in data and determining when to pause a transfer of the data and initiate an interrupt routine, the circuit comprising:

an error correcting code (ECC) encoder/decoder configured to detect and correct errors in a codeword being transferred;

a storage device interface in communication with said ECC encoder/decoder and a data storage device, said data storage device configured to store said codeword that is transferred to said host in response to said request; and

an interrupt initiation circuit in communication with said ECC encoder/decoder, the interrupt initiation circuit comprising:

a processor;

an erasure threshold register configured to store a first threshold value;

a full error threshold register configured to store a second threshold value; and

a first comparator configured to compare said first threshold value with a number of erasures detected by said ECC encoder/decoder, said first comparator further configured to output an erasure indication that indicates whether or not said number of erasures exceeds said first threshold value.

Claim 18 is allowable over Glover at least because Glover does not teach or suggest "an erasure threshold register configured to store a first threshold value" or "a full error threshold register configured to store a second threshold value". Instead, as noted above, Glover does not teach establishing any thresholds, and therefore does not

anticipate any registers for storing those thresholds. Moreover, Glover does not teach both an "erasure threshold register" and a "full error threshold register".

In view of the foregoing, Applicant respectfully submits that the rejection of claims 18 and 19 should be withdrawn.

E.   Claim 20

Applicant's independent claim 20 provides as follows (emphasis added):

20.   A method for determining when to pause the transfer of data, the method comprising:

establishing a full error threshold value;

establishing an erasure threshold value;

decoding a codeword being transferred from a data storage device;

indicating whether the codeword contains any errors;

determining the number of full errors;

determining whether the number of full errors exceeds the full error threshold value;

interrupting a processor and pausing the transfer of data if the number of full

errors exceeds the full error threshold value;

determining the number of erasures;

determining whether the number of erasures exceeds the erasure threshold value;

interrupting the processor and pausing the transfer of data if the number of
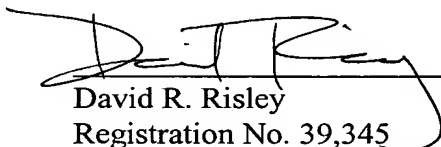
erasures exceeds the erasure threshold value.

Claim 20 is allowable over Glover at least because Glover does not teach or suggest "establishing a full error threshold value" and "establishing an erasure threshold

value", or "determining whether the number of full errors exceeds the full error threshold value" and "determining whether the number of erasures exceeds the erasure threshold value". Applicant therefore respectfully submits that the rejection should be withdrawn.

CONCLUSION

Applicant respectfully submits that Applicant's pending claims are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

Respectfully submitted,

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3-4-05 .

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